Selective in vitro activity of marine extract on genes encoding membrane synthesis of methicillin resistance Staphylococcus aureusaureus

ABSTRACT

Resistant strain issues of Staphylococcus aureus remain a global challenge and strategic drug discovery programs have been initiated to confront the issue through drug design based on infective target site. Methicillin resistant Staphylococcus aureus (MRSA) strains treated with a marine extract, exhibiting potential inhibitory activity through plate and tube assays were screened for activity on selected genes, namely genes encoding for important survival structure of bacteria. Bacterial cytoplasmic membrane is a vital structure and a critical barrier separating inside of cell from the environment. Disruption in membrane integrity will result in leakage of internal contents and followed by cell death. The necessity for bacteria to have membranes makes the membrane a practical target. With this premise, studies on MRSA membrane synthesis genes; msrR and mprF genes were conducted via molecular biotechnological approaches. The effect of the resistant gene mecA was also investigated. Alteration of nucleotide sequence after treatment was observed only in the mprF gene and was not evidence in nucleotide sequence of msrR gene. The selective targeting of mprF gene by the marine extract is an invaluable finding which requires further investigations on the feasibility of the target gene to be utilized in the development of anti-infective agent against MRSA. The research constitutes a scientific advancement in the field of medical treatment of drug resistant bacteria and a forefront study of drugs discovery program focusing drugs target genes.

Keyword: Infective target site; MprF gene; Staphylococcus aureus